

WHAT IS CLAIMED IS:

1. A method for configuring and communicating between a server node and a plurality of secondary nodes disposed on a modular downhole tool, comprising:
 - a) detecting, by the server node, the presence of each secondary node;and
 - b) at least one of:
 - i) requesting, by the server node, information from at least one of the plurality of secondary nodes; and
 - ii) issuing a control signal from the server node to at least one of the plurality of secondary nodes;wherein the server node is disposed on a first module of the modular downhole tool and wherein at least one of the plurality of secondary nodes is disposed on a second module of the modular downhole tool; and wherein the first and second modules are releasably coupled to one another.
2. The method of claim 1, wherein the presence of each secondary node is detected on a transmission medium connecting the server node to the plurality of secondary nodes.
3. The method of claim 1, wherein detecting comprises:
 - transmitting a wake-up message from the server node to each secondary node; and
 - receiving an acknowledgement from each secondary node.
4. The method of claim 1, wherein detecting comprises receiving, via the transmission medium, a message from a communications facility of each secondary node.
5. The method of claim 1, wherein the downhole tool further comprises a hub equipped with at least a transmitter and further comprising:

receiving, at the hub, information from the server node; and
transmitting the information to a remote location external to the downhole tool.

6. The method of claim 1, further comprising receiving, at the server node, measurement data collected by one or more of the secondary nodes.

7. The method of claim 6, wherein the measurement data is selected from one of resistivity data, pressure data, radiation data, orientation data and a combination thereof.

8. The method of claim 6, wherein the downhole tool further comprises a hub equipped with at least a transmitter and further comprising:

receiving, at the hub, measurement data from the server node; and
transmitting the measurement data to a remote location external to the downhole tool.

9. The method of claim 8, wherein the measurement data is selected from one of resistivity data, pressure data, radiation data, orientation data and a combination thereof.

10. The method of claim 1, wherein at least a portion of the secondary nodes are equipped with measurement devices and further comprising:

collecting measurement data by the measurement devices; and
transmitting the measurement data to the server node.

11. The method of claim 10, wherein the downhole tool further comprises a hub equipped with at least a transmitter and further comprising:

receiving, at the hub, the measurement data from the server node; and
transmitting the measurement data to a remote location external to the downhole tool.

12. A signal bearing medium containing a program which, when executed by a server node, performs an operation for configuring and communicating between a server node and a plurality of secondary nodes disposed on a modular downhole tool comprising, the operation comprising:

a) detecting, by the server node, the presence of each secondary node;
and

b) at least one of:

i) requesting, by the server node, information from at least one of the plurality of secondary nodes; and

ii) issuing a control signal from the server node to at least one of the plurality of secondary nodes.

13. The signal bearing medium of claim 12, wherein the presence of each secondary node is detected on a transmission medium connecting the server node to the plurality of secondary nodes.

14. The signal bearing medium of claim 12, wherein the server node is disposed on a first module of the modular downhole tool and wherein at least one of the plurality of secondary nodes is disposed on a second module of the modular downhole tool; and wherein the first and second modules are releasably coupled to one another.

15. The signal bearing medium of claim 12, further comprising, prior to detecting, transmitting a wake-up message from the server node to each secondary node.

16. The signal bearing medium of claim 12, wherein detecting comprises receiving, via the transmission medium, a message from a communications facility of each secondary node.

17. The signal bearing medium of claim 12, further comprising:

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transmitting, from the server node, information received from the secondary nodes to a transmitter configured to transmit the information to a remote location external to the downhole tool.

18. The signal bearing medium of claim 12, further comprising receiving, at the server node, measurement data collected by one or more of the secondary nodes.

19. The signal bearing medium of claim 18, wherein the measurement data is selected from one of resistivity data, pressure data, radiation data, orientation data and a combination thereof.

20. The signal bearing medium of claim 18, further comprising:
transmitting the measurement information from the server node to a transmitter configured to transmit the measurement information to a remote location external to the downhole tool.

21. The signal bearing medium of claim 20, wherein the measurement data is selected from one of resistivity data, pressure data, radiation data, orientation data and a combination thereof.

22. A downhole communications system, comprising:
a server node, comprising:
a) a transceiver configured to communicate with a plurality of secondary nodes; and
b) a controller connected to the transceiver and configured to perform an operation, comprising:
i) detecting the presence of the plurality of secondary nodes;
and
ii) at least one of:

requesting, via the transceiver, information from at least one of the plurality of secondary nodes; and
issuing, via the transceiver, a control signal to at least one of the plurality of secondary nodes.

23. The downhole communications system of claim 22, wherein the operation performed by the controller further comprises forwarding, via the transceiver, the information received from at least one of the plurality of secondary nodes to a hub transmitter configured to transmit the information to a remote location external to the downhole communications system.

24. The downhole communications system of claim 22, wherein the transceiver is a wireless transceiver.

25. The downhole communications system of claim 22, wherein the server node and the plurality of secondary nodes are located in different modules of a modular downhole tool.

26. The downhole communications system of claim 23, wherein the modular downhole tool is a drilling tool.

27. The downhole communications system of claim 23, wherein the server node and the plurality of secondary nodes communicate via a physical transmission medium.

28. The downhole communications system of claim 27, wherein the controller is a CAN controller and the physical transmission medium is a CAN bus.

29. The downhole communications system of claim 22, wherein at least a portion of the plurality of secondary nodes comprises a measurement device.

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30. The downhole communications system of claim 29, wherein the measurement device comprises logging instruments.

31. The downhole communications system of claim 29, wherein the measurement device is selected from at least one of a gamma radiation measurement device, resistivity measurement device, a pressure measurement device, an orientation measurement device and a combination thereof.

32. A downhole tool, comprising:

at least one secondary downhole tool module equipped with at least a secondary node; and

a server downhole tool module releasably connected to the least one secondary downhole tool module and equipped with at least a server node communicably connected to the secondary node and configured perform an operation, comprising:

- a) detecting the presence of the secondary node; and
- b) at least one of:
 - i) requesting information from the secondary node; and
 - ii) issuing a control signal to the secondary node.

33. The system of claim 29, wherein the server node comprises:

a controller configured to perform the operation; and
a transceiver connected to the controller.

34. The system of claim 33, wherein the controller is a CAN controller.

35. The system of claim 29, wherein the downhole tool is a drilling tool.

36. The system of claim 29, further comprising a transmitter in communication with the server node and configured to transmit information received from the server node to a remote location external to the downhole tool; and wherein the operation

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performed by the server node further comprises forwarding the information received from the secondary node to the transmitter.

37. The system of claim 29, wherein the at least one secondary downhole tool module comprises a plurality of secondary downhole tool modules each equipped with a respective secondary node.

38. The system of claim 37, wherein at least a portion of the respective secondary nodes comprises a measurement device.

39. The system of claim 38, wherein the measurement device comprises logging instruments.

40. The system of claim 38, wherein the measurement device is selected from at least one of a gamma radiation measurement device, resistivity measurement device, a pressure measurement device, an orientation measurement device and a combination thereof.

41. A method for configuring and communicating between a server node and a plurality of devices disposed on a modular downhole tool, wherein the server node is disposed on a first module of the modular downhole tool and wherein at least one of the plurality of devices is disposed on a second module of the modular downhole tool; and wherein the first and second modules are releasably coupled to one another, the method comprising:

detecting, by the server, the presence of each device; wherein each device is configured for at least one of measuring an environmental parameter and controlling an operation the modular downhole tool; and

transmitting information received from at least one of the plurality of devices to a remote location external to the downhole tool.

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42. The method of claim 41, wherein the environmental parameter is selected from one of resistivity, pressure, radiation, orientation and a combination thereof.

43. The method of claim 41, wherein the transmitting is performed by a transmitter connected the server node.

44. The method of claim 41, wherein detecting comprises:
transmitting a wake-up message from the server node to a respective communications facility associated with each device; and
receiving an acknowledgement from each communications facility.